CLAIMS

[0050] What is claimed is:

1. An apparatus comprising:
   a phase-shift generator to provide a phase-shift of substantially $\pi/2$ radians to an oscillation signal between a first oscillation tank, which provides substantially no phase-shift, and a second oscillation tank.

2. The apparatus of claim 1, comprising an additional phase-shift generator to provide a phase-shift of substantially $\pi/2$ radians to the oscillation signal from the second oscillation tank.

3. The apparatus of claim 2, comprising a phase-inverter to invert the phase of the oscillation signal.

4. The apparatus of claim 3, wherein the phase-inverter comprises an amplifier.

5. The apparatus of claim 4, wherein the amplifier is able to provide a gain such that a total gain across a loop, which comprises the amplifier, the first and second oscillating tanks, the phase-shift generator and the additional phase-shift generator, is equal to substantially one.

6. The apparatus of claim 5, comprising one or more transconductors to convert said oscillation signal from voltage to current.

7. An oscillator comprising:
   a first oscillation tank which produces substantially no phase-shift;
   a second oscillation tank which produces substantially no phase-shift; and
   a phase-shift generator to shift by substantially $\pi/2$ radians a phase of a signal from said first oscillation tank.

8. The oscillator of claim 7, comprising an additional phase-shift generator to shift by substantially $\pi/2$ radians a phase of a signal from the second oscillation tank.

9. A wireless communication device comprising:
a dipole antenna to send and receive wireless signals; and
a quadrature oscillator comprising a phase-shift generator to provide a phase-shift of substantially $\pi/2$ radians to an oscillation signal between a first oscillation tank, which provides substantially no phase-shift, and a second oscillation tank.

10. The wireless communication device of claim 9, wherein the quadrature oscillator comprises an additional phase-shift generator to provide a phase-shift of substantially $\pi/2$ radians to the oscillation signal from the second oscillation tank.

11. The wireless communication device of claim 10, wherein the quadrature oscillator comprises a phase-inverter to invert the phase of the oscillation signal.

12. The wireless communication device of claim 11, wherein the phase-inverter comprises an amplifier.

13. The wireless communication device of claim 12, wherein the amplifier is able to provide a gain such that a total gain across a loop, which comprises the amplifier, the first and second oscillating tanks, the phase-shift generator and the additional phase-shift generator, is equal to substantially one.

14. The wireless communication device of claim 13, comprising one or more transconductors to convert said oscillation signal from voltage to current.

15. A method comprising:
providing a phase-shift of substantially $\pi/2$ radians to an oscillation signal between a first oscillation tank, which provides substantially no phase-shift, and a second oscillation tank.

16. The method of claim 15, wherein the second oscillation tank produces substantially no phase-shift, and further comprising providing a phase-shift of substantially $\pi/2$ radians to the oscillation signal from the second oscillation tank.

17. The method of claim 16, further comprising, after providing the additional phase-shift of substantially $\pi/2$ radians to the oscillation signal from the second oscillation tank of substantially $\pi/2$ radians, inverting the phase of the oscillation signal.

18. The method of claim 17, wherein inverting the phase of said oscillation signal comprises amplifying said oscillation signal.

19. The method of claim 18, comprising converting said oscillation signal from voltage to current.